



**COLORADO**

**Colorado Water  
Conservation Board**

Department of Natural Resources

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**TO:** Colorado Water Conservation Board Members

**FROM:** Kevin Houck, Section Chief  
Joe Busto, Scientist Researcher, Watershed Protection and Flood Mitigation Section

**DATE:** November 18-19, 2015 Board Meeting

**AGENDA ITEM:** 19a. Non-Reimbursable Project Investments  
Water Forecasting Partnerships Project

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### Introduction

The Rio Grande Forecasting Project winter 2014-15 was a historic project in the United States. The CWCB and local water users partnered with NASA Aerial Snow Observatory, NOAA-National Severe Storms Lab, the National Center for Atmospheric Research, and Riverside Technologies, inc. to support the project by comparing existing water forecast methods to emerging technologies for snowpack assessment and water modeling. We also had RTI develop the NWS West Gulf RFC hydrologic modeling to put it in the hands of the DWR. Initial results were that the WRF-Hydro model was robust, the mobile radar put precipitation where it belonged for modeling, and we had a snow on flight and await a snow free flight from NASA. NASA will provide value added as they do for the California DWR.

In the Rio Grande, water forecasting is an issue and the DWR found that four of the last ten years have had large volumetric forecast errors with impacts in the millions of dollars to the water users. NCAR has a new \$1M contract with NWS-Office of Hydrologic Development to run WRF-Hydro for the nation. It is known that WRF-Hydro is superior modeling but more quality data, field projects, and optimization are needed to outperform existing methods. We will partner with forecasters on R&D to benefit compacts, apportionment, and beneficial use in Colorado.

Traditional snow data at a few discrete points will not serve us well now or in the future. Nor will reliance on historical data sets to estimate the water volume numbers today. We need to partner and force the future by developing more and better data and modeling for a better way of doing business. This project request builds on success in the Rio Grande with plans to work with the agencies to implement projects in other watersheds. Dick Wolfe has stated there is a general need for better forecasting statewide and Nathan Coombs of the Conejos Water District said, "Working with these experts and the new science has absolutely put more water at the head gates of our users."

### Staff Recommendation

Staff recommends the Board request the General Assembly to authorize \$300,000 from the Construction Fund to be appropriated to the Department of Natural Resources for allocation to CWCB for the Water Forecasting Partnerships Project.





## Water Forecasting Partnerships Project

Colorado Water Conservation Board

November 2015 Board Meeting

The Rio Grande Forecasting Project was a historic end-to-end field demonstration project with new data and new modeling to compare with existing forecast methods. The final report is due at the end of this calendar year and we seek to build on the success. Volumetric water supply forecasts in the Rio Grande for four of the last ten years had between a 16%-50% discrepancy from forecasted to actual levels with impacts in the tens of millions of dollars to water users. The complexity of compacts, surface and ground water, and equitable apportionment now make it so there is less tolerance for these errors. Better characterization of snowpack, new ground and aerial remote sensing data, and better hydrologic modeling are needed. The State Engineer said there is a general need for better forecasting statewide. Better forecasts help the DWR and municipal, agriculture, environmental (including ESA issues), recreation, and other interests. Accurate forecasts are needed by well owners that rely on streamflow forecasts for replacement of water through the augmentation plans and support the 2011 Adopted Irrigation Rules in the Rio Grande. Nathan Coombs Manager of the Conejos Water District said, "Working with these experts using the new science has absolutely put more water at the head gates of our users."

The red stars are proposed upgrades the NRCS will install and maintain if we help purchase the sensors. We direct federal priorities with funding and local, state, and federal partnerships.

P R O J E C T D E T A I L S	
<i>Project Cost:</i>	\$300,000 (matching sought)
<i>NRI Funding Request:</i>	\$300,000
<i>Funding Source:</i>	Construction Fund
<i>Project Type:</i>	Data and Modeling Upgrades
<i>Type of Grantee:</i>	Funding for Partnerships

L O C A T I O N	
<i>Benefits:</i>	Statewide
<i>Water Source:</i>	Various
<i>Drainage Basin:</i>	All Basins

